

telescopes, and have nothing exactly corresponding to a vast emporium such as that of Max Kohl. All the more reason, therefore, for the association and discipline urged on his French colleagues and co-workers by Cornu.

R. T. G.

AMERICAN FOOD AND GAME FISHES.

American Food and Game Fishes: a Popular Account of all the Species found in America North of the Equator, with Keys for Ready Identification, Life Histories and Methods of Capture. By David Starr Jordan and Barton Warren Evermann. Pp. 1 + 573; illustrated with coloured plates and text drawings, and with photographs from life. (London: Hutchinson and Co., 1902.)

DRS. JORDAN AND EVERMANN, who have recently enriched science by the publication, under the auspices of the Smithsonian Institution, of a great work in four volumes describing in detail the 3300 species of fishes distinguished by them in North and Central America, reviewed not long ago in the columns of NATURE, have now prepared another book, intended to

“furnish that which well-informed men and women, and those who desire to become well informed, might wish to know of the food and game fishes which inhabit American waters.”

This book, teeming with interest from the full accounts, presented in a charming manner, of the habits, distribution and uses of the more important forms from the point of view of the angler, has been lavishly got up in America. The coloured pictures, as well as the photographs taken from life with marvellous success by Mr. A. Radclyffe Dugmore, could not be surpassed in excellence, and the numerous “process-blocks” which have already appeared in various American publications will, thanks to the perfect accuracy with which the fishes have been delineated, greatly facilitate identifications. Authors and publishers are to be congratulated on the production of such a book, which will undoubtedly have the effect of enlisting a more scientific interest in fishes on the part of many who have hitherto looked upon them as mere objects of sport or curiosity, and to whom the use of the more technical treatises on the subject would be distasteful. In deference to such readers, the systematic aspect has been reduced to the narrowest limits that appear compatible with the proper recognition of the numerous genera and species dealt with. It is to be hoped that not a few whose interest is sure to be awakened by a perusal of this charming book will later turn to the more technical work by the same authors, and improve their knowledge through a study of the relationships existing between the various families of fishes, which are here merely defined without any allusion to the higher groups into which they fall.

American taxonomists have always shown a particular predilection for reducing all divisions of the system to the narrowest possible limits. This tendency is carried to the extreme by Messrs. Jordan and Evermann, who inform us in the introduction that not only the lampreys and hags are to be excluded from the class Pisces, but also the sharks and rays, the lung-fishes and

Polypterus, which they regard as only fish-like creatures, fishes in the broad sense of the term, but not “true fishes,” and are therefore excluded from the work. Ganoids, on the other hand, are still maintained among fishes proper. In conformity with this method of excessive multiplication of systematic divisions of all grades, the various forms of Salmonidæ which are usually regarded as subspecies, such as the land-locked salmon and the varieties of *Salmo clarkii*, *gairdneri* and *fontinalis*, are all dealt with as distinct species—twenty-six species instead of the four admitted by the same authors in their previous work. True, a few pages before, the authors pertinently remark that

“The non-migratory species (subgenus *Trutta*) occur in both continents, are extremely closely related and difficult to distinguish, if, indeed, all be not necessarily regarded as forms of a single exceedingly unstable and variable species. The excessive variations in colour and form have given rise to a host of nominal species. European writers have described numerous hybrids among the various species of *Salmo*, real or nominal, found in their waters. We have thus far failed to find the slightest evidence of any hybridism among American Salmonidæ in a state of nature. Puzzling aberrant or intermediate individuals certainly occur, but such are not necessarily hybrids.”

Bearing in mind the authors' tendency to excessive multiplication of species and higher divisions, it is not a little surprising to read in the introduction that the “true fishes” of the whole world are estimated at only 12,000 species, arranged in about 200 families. A careful computation which has recently been made by the reviewer, applying somewhat different canons of classification, has resulted in numbers that are not very different, viz. 11,200 for the species and 160 for the families. The number of species in the American authors' estimate is even far below that given in the article “Ichthyology” in the supplementary volumes of the “Encyclopædia Britannica,” viz. 17,000.

The usefulness of the work is enhanced by special chapters on the external characters of fishes from the descriptive point of view, on fly-fishing (by Mr. E. J. Keyser), a glossary of technical terms, and an artificial key to the families of American food and game fishes.

The copy received for review bears the mark of a London publishing firm. But the identical book was issued in May last by Messrs. Doubleday, Page and Co., at New York.

G. A. B.

HUMAN ANATOMY.

Text-Book of Anatomy. Edited by D. J. Cunningham, F.R.S. Pp. xxix + 1309; 824 wood engravings from original drawings. (Edinburgh: Pentland, 1902.)

AT the present time the human anatomist tries to sit as comfortably as he may on the two stools of science and practice. It must be admitted that few do it with success. While his posture evokes the indulgent smile of the man of science, the professed zoologist and morphologist, the man of practice, the surgeon and physician, regards it as altogether unprofitable and impracticable. To reconcile the views of these two contending factions, to make the theory of anatomy assist in its practical application to the sick and the facts of

anatomy illumine the laws of mammalian morphology, is the first and chief difficulty of anyone who now or afterwards undertakes the preparation of a text-book on human anatomy. No living anatomist is likely to be more successful in overcoming this difficulty than Prof. D. J. Cunningham, who is deservedly held in the highest esteem by the surgeon and physician, as well as by the man of science. While admitting that Prof. Cunningham has been more successful than any one of his predecessors, one rises from the study of this work with the feeling that, in spite of rapid improvement, it will take decades of progress to make the theory of anatomy fit its facts as a glove does the hand.

Not a single decade has passed during the last two centuries without someone proclaiming from the housetops that at last the whole field of human anatomy is explored and finished, and yet the annual output of new research has continually increased. The manner in which this work is produced is evidence of the rapid growth of the subject. It is no longer possible for one man to be intimately acquainted with the more recent work or to supply first-hand information in each of the many departments into which human anatomy has been subdivided, and hence the necessity for a collective effort. Works of reference like the English Quain, the French Poirier, the German Bardeleben, necessarily demand the combined services of specialists, but here, even in a work designed to meet the needs of candidates for a pass degree, the same necessity has been felt. The editor has been fortunate in the selection of his collaborators. To Prof. Young, of Owens College, and Prof. Robinson, of King's College, London, have been assigned the sections on embryology and the vascular system; to Prof. Thomson, of Oxford, that on osteology; to Prof. Paterson, of Liverpool, the muscular and nerve systems; to Dr. Hepburn, of Edinburgh University, the section on joints; to Prof. Howden, of Durham University, the section on the organs of special sense; to Prof. Birmingham, of Dublin, the organs of digestion; to Prof. Dixon, of Cardiff, the urinogenital system; to Dr. Stiles, the section on surgical anatomy; while the editor himself undertook the central nervous system. It may be said at once that each contributor has given, not only the best that is known, but has also made original contributions to his particular section. Some of the sections, such as those on the nervous system, the alimentary system and embryology, gave their authors a greater opportunity than did others, and these opportunities have not in any single case been allowed to slip by.

There is a unity in the work which may be explained by the fact that all the contributors, with one exception, are pupils of the veteran leader of the Edinburgh anatomists, Sir William Turner, to whom the book is most worthily dedicated. This work has all the merits and also all the defects of the Edinburgh school. There are the full and lucid descriptions of the important things, but there is also an over-strenuous endeavour to be thorough by the introduction of masses of unimportant or irrelevant detail. Turn, for instance, to the description of the spermatozoon, and it will be found that the medical student is expected to master more than fifty details concerning its structure; or turn to the descriptions of a bone, a muscle or an artery, and the

same crowding of detail will be found. A student who thoroughly prepares himself from this work will present himself to his examiners loaded with more than 60,000 anatomical facts, 75 per cent. of which will appeal to his memory more than to his intelligence, and only a small percentage of which will be of use to him in the practice of his profession. It is a primary defect of the Edinburgh school that, owing to its detachment from the hospitals, it has come to regard the study of anatomy as an end in itself instead of being only the scaffolding on which a student has to lay his knowledge of physiology. On the combined basis of anatomy and physiology he has subsequently to build his knowledge of pathology, surgery and medicine, and all the efforts of the anatomist and physiologist must be bent so as to reach this end. The student, when he comes to build out his mental picture of the circulation, respiration and locomotion of the human body, will find that this work will afford scarcely a better anatomical scaffolding than older and less complete works.

One feels that Prof. Cunningham has let slip an opportunity that occurs to a man only once in a century. With such a powerful syndicate of anatomists behind him he could have disregarded the prejudices of examiners, relegated thousands of useless anatomical details to the limbo of oblivion and made his subject once again live. That he has not done so shows that the principle on which present systems of anatomy are designed meets with his deliberate approval, and it is on those broad lines that most thinking men will join issue with him.

During his study of this work the reviewer has laid it side by side with Bell's "Anatomy," another triumph of the Edinburgh school, but of a century ago. The opinion has been forced on him that the design of the older book is the better of the two. All through Bell's pages, in spite of some crude theories, inaccurate facts and passing personalities, anatomy is made to coquet with physiology and morphology, and all three are invariably made to serve as handmaidens to the surgeon and physician. The ideal treatise of human anatomy will be produced by the man who accepts the principles of the anatomists of the beginning of last century and applies them to the facts at the disposal of anatomists at the beginning of the present one.

The illustrations of this work are all well designed and artistically finished, but the poorness of its binding and its narrow margins, which give it a general appearance of meanness, are out of keeping with the high standard of its contents and the artistic demands of the present day medical student.

A. KEITH.

DIFFERENTIAL CALCULUS FOR BEGINNERS.

Differential Calculus for Beginners. By Alfred Lodge, M.A., with an Introduction by Sir Oliver J. Lodge, D.Sc., F.R.S., LL.D., Principal of the University of Birmingham. Pp. xxv + 278. (London: George Bell and Sons, 1902.) Price 4s. 6d.

PROF. ALFRED LODGE is so well known among mathematicians as an authority on the teaching of geometry and kindred subjects that the addition of his brother's name to the title-page may appear superfluous.